10069678

JC13 Rec'd PCT/PTO 0 3 APR 2002

配列表

SEQUENCE LISTING

<110> ASANO Shinichiro et al.

<120> Protein Having Insecticidal Activity, DNA Coding Said Protein, Pest Control Agent and Pest Control Method

<130> BOF-3887PCT

<150> JP 2000-236140

<151> 2000-08-03

<160> 3

<210> 1

<211> 1167

<212> PRT

<213> Bacillus thuringiensis

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Gln Thr Thr Leu Gln Asn Met Asn Tyr Lys Asp Tyr Leu Arg Met 35 40 45

Ser Glu Gly Glu Asn Pro Glu Leu Phe Gly Asn Pro Glu Thr Phe Ile 50 55 60

Ser Ser Ser Thr Val Gln Thr Gly Ile Gly Ile Val Gly Gln Val Leu 65 70 75 80

Gly Ala Leu Gly Val Pro Phe Ala Gly Gln llc Ala Ser Phe Tyr Ser 85 90 95

Phe Ile Val	Gly Gln 100	Leu Trp	Pro Ser 105	Ser Thr	Val Ser	Val Trp Glu 110
Met Ile Met 115	Lys Gln	Val Glu	Asp Leu 120	lle Asp	Gln Lys 125	Ile Thr Asp
Ser Val Arg 130	Lys Thr	Ala Leu 135	Ala Gly	Leu Gln	Gly Leu 140	Gly Asp Gly
Leu Asp Val 145	Tyr Gln	Lys Ser 150	Leu Lys	Asn Trp 155	Leu Glu	Asn Arg Asn 160
Asp Thr Arg	Ala Arg 165	Ser Val	Val Val	Thr Gln 170	Tyr Ile	Ala Leu Glu 175
Leu Asp Phe	Val Ala 180	Lys Ile	Pro Ser 185	Phe Ala	Ile Ser	Gly Gln Glu 190
Val Pro Leu 195		Val Tyr	Ala Gln 200	Ala Ala	Asn Leu 205	His Leu Leu
Leu Leu Arg 210	Asp Ala	Ser Ile 215	Phe Gly	Ala Glu	Trp Gly 220	Phe Thr Pro
Gly Glu Ile 225	Ser Thr	Phe Tyr 230	Asp Arg	Gln Val 235	Thr Arg	Thr Ala Gln 240
Tyr Ser Asp	Tyr Cys 245		Trp Tyr	Asn Thr 250	Gly Leu	Asp Lys Leu 255
Lys Gly Thr	Asn Ala 260	Ala Ser	Trp Leu 265	Lys Tyr	His Gln	Phe Arg Arg 270
Glu Met Thr 275		Val Leu	Asp Leu 280	Val Ala	Leu Phe 285	Pro Asn Tyr

Asp Thr Arg Thr Tyr Pro Ile Glu Thr Thr Ala Gln Leu Thr Arg Glu

	290					295					300				
Va l 305	Tyr	Thr	Asp	Рго	Ile 310	Val	Phe	Asn	Arg	Glu 315	Thr	Ser	Gly	Gly	Phe 320
Cys	Arg	Arg	Trp	Ser 325	Leu	Asn	Ser	Asp	Ile 330	Ser	Phe	Ser	Glu	Va I 335	Glu
Ser	Ala	Val	11e 340	Arg	Ser	Pro	His	Leu 345	Phe	Asp	Ile	Leu	Ser 350	Glu	He
Glu	Phe	Туг 355	Thr	Thr	Arg	Ala	Gly 360	Leu	Pro	Leu	Asn	Asn 365	Thr	Glu	Туг
Leu	Glu 370	Tyr	Тгр	Val	Gly	His 375	Ser	He	Lys	Туг	Lys 380	Asn	Thr	Asn	Ala
Ser 385	Ser	Ala	Leu	Glu	Arg 390	Asn	Туг	Gly	Thr	I le 395	Thr	Ser	Asn	Lys	Ile 400
Lys	Tyr	Туг	Asp	Leu 405	Ala	Asn	Lys	Asp	Ile 410	Phe	Gln	Val	Arg	Ser 415	Leu
Gly	Ala	Asp	Leu 420	Ala	Asn	Туг	Tyr	Ala 425	Gln	Val	Tyr	Gly	Val 430	Pro	Туг
Ala	Ser	Phe 435	Thr	Leu	Leu	Asp	Lys 440	Asn	Thr	Gly	Ser	Gly 445	Ser	Val	Gly
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Arg	Gly	Tyr	Ser	His		Leu	Ser	His	lle 490		Ser	Tyr	Ser	Phe 495	

- Lys Asn Ala Ser Ser Pro Ala Arg Tyr Gly Asn Leu Pro Val Phe Ala Trp Thr His Arg Ser Ala Asp Val Thr Asn Thr Val Tyr Ser Asp Lvs He Thr Glu He Pro Val Val Lys Ala His Thr Leu Val Ser Gly Thr Thr Val lle Lys Gly Pro Gly Phe Thr Gly Gly Asn Ile Leu Lys Arg The Ser Ser Gly Pro Leu Ala Tyr The Ser Val Ser Val Lys Ser Pro Leu Ser Gln Arg Tvr Arg Ala Arg Ile Arg Tyr Ala Ser Thr Thr Asn Leu Arg Leu Phe Val Thr Ile Ser Gly Thr Arg Ile Tyr Ser Ile Asn Val Asn Lys Thr Met Asn Lys Gly Asp Asp Leu Thr Phe Asn Thr Phe Asp Leu Ala Thr Ile Gly Thr Ala Phe Thr Phe Ser Asn Tyr Ser Asp Ser Leu Thr Val Gly Ala Asp Ser Phe Ala Ser Gly Gly Glu Val Tyr
- Glu Asp Leu Asp Val Ala Lys Lys Ala Val Asn Gly Leu Phe Thr Ser 675 680 685

Val Asp Lys Phe Glu Leu Ile Pro Val Asn Ala Thr Phe Glu Ala Glu

Lys Lys Asp Ala Leu Gln Thr Ser Val Thr Asp Tyr Gln Val Asn Gln 690 695 700

Ala 705	Ala	Asn	Leu	Val	Glu 710	Cys	Leu	Ser	Asp	G1u 715	Leu	Tyr	Pro	Asn	Glu 720
Lys	Arg	Me t	Leu	Trp 725	Asp	Ala	Val	Lys	G1u 730	Ala	Lys	Arg	Leu	Val 735	Gln
Ala	Arg	Asn	Leu 740	Leu	Gln	Asp	Thr	Gly 745	Phe	Asn	Arg	He	As n 750	Gly	Glu
Asn	Gly	Тгр 755	Thr	Gly	Ser	Thr	Gly 760	He	Glu	Val	Ala	G1 u 765	Gly	Asp	Val
Leu	Phe 770	Lys	Asp	Arg	Ser	Leu 775	Arg	Leu	Thr	Ser	Ala 780	Arg	Glu	Ile	Asp
Thr 785	Glu	Thr	Туг	Pro	Thr 790	Tyr	Leu	Tyr	Gln	Gln 795	Ile	Asp	Glu	Ser	Leu 800
Leu	Lys	Pro	Туг	Thr 805	Arg	Туг	Lys	Leu	Lys 810	Gly	Phe	He	Gly	Ser 815	Ser
Gln	Asp	Leu	GI u 820	He	Lys	Leu	He	Arg 825	His	Arg	Ala	Asn	Gln 830	Ile	Val
Lys	Asn	Val 835	Pro	Asp	Asn	Leu	Leu 840	Pro	Asp	Val	Leu	Pro 845	Val	Asn	Ser
Cys	Gly 850	Gly	Пe	Asp	Arg	Cys 855	Ser	Glu	Gln	Gln	Туг 860	Val	Asp	Ala	Asn
Leu 865	Ala	Leu	Glu	Asn	Asn 870	Gly	Glu	Asn	Gly	Asn 875	Me t	Ser	Ser	Asp	Ser 880
His	Ala	Phe	Ser	Phe 885	His	Ile	Asp	Thr	Gly 890		He	Asp	Leu	As n 895	
Asn	Thr	Gly	He	Trp	Val	Val	Phe	Lys	He	Pro	Thr	Thr	Asn	Gly	Tyr

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Glu Thr Leu Glu Arg Ala 930	Gin Gin Gin Giu Gin Gin 935 94	
Met Ala Arg Lys Arg Gly	Ala Ser Glu Lys Ala Ty	r Tyr Ala Ala Lys
945 950	955	960
Gln Ala Ile Asp Arg Leu	Phe Ala Asp Tyr Gln Asp	o Gln Lys Leu Asn
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Ser Gly Val Glu Met Ser	Asp Met Leu Ala Ala Gli	n Asn Leu Val Gln
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Ser Ile Pro Tyr Val Tyr	Asn Asp Ala Leu Pro Glo	ı ile Pro Gly Met
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Asn Tyr Thr Ser Phe Thr 1010	Glu Leu Thr Asn Arg Le 1015 102	
Asn Leu Tyr Asp Leu Arg 1025 1030		y Asp Phe Arg Asn 1040
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Ala Arg Lys Glu Gly Val 1090	Gly Asp Gly Tyr Val II 1095 IIC	

Ala Asn Gln Thr Glu Thr Leu Thr Phe Asn Ile Cvs Asp Asp Asp Thr 1105 1110 1115 1120 Gly Val Leu Ser Ala Asp Gln Thr Ser Tyr Ile Thr Lys Thr Val Glu 1125 1130 1135 Phe Thr Pro Ser Thr Glu Gln Val Trp Ile Asp Met Ser Glu Thr Glu 1140 1145 1150 Gly Val Phe Asn Ile Glu Ser Val Glu Leu Val Leu Glu Glu Glu 1155 1160 1165 <210> 2 ⟨211⟩ 3504 <212> DNA <213 Bacillus thuringiensis ⟨220⟩ <221> CDS (222) (1).. (3501) <400> 2 atg agt cca aat aat caa aat gaa tat gaa att cta gat gct tca tca Met Ser Pro Asm Asm Glm Asm Glu Tvr Glu Ile Leu Asp Ala Ser Ser 1 5 10 15 tot act tot gia too gat aat tot git aga tac cot tia goa aac gat Ser Thr Ser Val Ser Asp Asn Ser Val Arg Tyr Pro Leu Ala Asn Asp 25 30 20 caa acg acc aca tta caa aac atg aac tat aaa gat tat ctg aga atg 144 Gin Thr Thr Leu Gln Asn Met Asn Tyr Lys Asp Tyr Leu Arg Met 35 40 45 tot gag gga gag aat oot gaa tia tit gga aat oog gag acg tit att

Ser	Glu	Gly	Glu	Asn	Pro	Glu	Leu	Phe	Gly	Asn	Pro	Glu	Thr	Phe	He	
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agt	tca	tct	acg	gtt	caa	ac t	gga	a t t	ggc	att	gtt	ggt	caa	gta	ctg	240
Ser	Ser	Ser	Thr	Val	Gln	Thr	GIy	He	Gly	He	Val	Gly	Gln	Val	Leu	
65					70					75					80	
999	gct	t ta	ggg	gtt	cca	ttt	gct	gga	cag	ata	gc t	agt	ttt	tat	agt	288
	Ala			_												
,			,	85				,	90					95		
110	att	gic	ggt	caa	tta	tgg	cca	tca	agt	acc	gtg	agt	gta	tgg	gaa	336
	He															
			100		200	,		105			,		110		0.0	
			100					100					110			
ato	att	atσ	aaa	caa	øtø	gaa	gat	cta	att	gat	caa	ааа	ata	aca	gat	384
	He															001
mc t	110	115	Lys	0111	141	014	120	Lcu	110	пор	0111	125	110	1111	пор	
		110					120					120				
tet	gta	2 aa	222	202	aca	ctt	σca	gga	cta	caa	σσa	tta	gga	o a t	aac	432
	Val															102
361	130	пів	Lys	1111	Mid	135	Mid	01)	Leu	0111	140	Leu	01,	пор	01,	
	130					100					140					
112	gac	at a	tat	can	222	tea	ctt	220	aat	1 00	cta	as s	aat	cat	aat	480
	Asp															100
145	пэр	141	1 9 1	0111	150	JCI	LCu	Lys	поп	155	LCu	oru	11311	т. Б	160	
140					100					100					100	
an t	aca	ene	ac t	242	ant	at t	σtσ	σtσ	acc	caa	tat	ata	ac t	tta	σασ	528
-	Thr	_	-	-												020
пар	1111	мів	ліа	165	JCI	141	141	141	170	Oin	1 9 1	110	ni a	175	014	
				100					110					110		
	gat		~++	an t	222	ato		101		aco	212	tet	aan	can	an a	576
	Asp			-						-						310
Leu	ASP	rne		Ald	Lys	116	110		rne	на	116	361			Giu	
			180					185					190			
												11.		44	-1-	C 0 4
	сса															624
Val	Pro			Ser	Val	Fyr			Ala	Ala	Asn			Leu	ren	
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Leu	Leu	Arg	Asp	Ala	Ser	Пe	Phe	Gly	Ala	Glu	Trp	Gly	Phe	Thr	Pro	
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Gly	Glu	Пe	Ser	Thr	Phe	Tyr	Asp	Arg	Gln	Val	Thr	Arg	Thr	Ala	Gln	
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Tyr	Ser	Asp	Туг	Cys	Val	Lys	Trp	Tyr	Asn	Thr	Gly	Leu	Asp	Lys	Leu	
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aaa	ggt	acg	aat	gc t	gca	agt	tgg	ctg	aag	tat	cac	caa	ttc	cga	aga	816
Lys	Gly	Thr	Asn	Ala	Ala	Ser	Trp	Leu	Lys	Tyr	His	Gln	Phe	Arg	Arg	
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gaa	atg	aca	tta	ctg	gta	t t a	gat	t t a	gta	gcg	t t a	ttt	сса	aac	tat	864
Glu	Met	Thr	Leu	Leu	Val	Leu	Asp	Leu	Val	Ala	Leu	Phe	Pro	Asn	Tyr	
		275					280					285				
-				tat												912
Asp	Thr	Arg	Thr	Tyr	Pro	He	Glu	Thr	Thr	Ala		Leu	Thr	Arg	Glu	
	290					295					300					
			-	cca												960
	Туг	Thr	Asp	Pro		Val	Phe	Asn	Arg		Thr	Ser	Gly	Gly		
305					310					315					320	
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Cys	Arg	Arg	Trp	Ser		Asn	Ser	Asp		Ser	Phe	Ser	Glu			
				325					330					335		
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				cgt												1056
Ser	Ala	Val		Arg	Ser	Pro	His			Asp	He	Leu			11e	
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Lys	Tyr	Туг	Asp		Ala	Asn	Lys	Asp		Phe	GIn	Val	Arg		Leu	
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aaa	aca	gat	tta	or t	aat	tac	tac	gra	cap	gta	tat	gga	gtt	ccg	tac	1296
		Asp														
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																1202
		acg														1392
Gly		Thr	ıyr	Ser	Lys	455	HIS	Inr	Inr	meı	460	Val	Cys	1111	GIII	
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		Asn														
465					470					475					480	
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Arg	Gly	Tyr	Ser	His	Arg	Leu	Ser	His	He	Thr	Ser	Tyr	Ser			
				485					490)				495	j	
																1500
															gct	1536
Lys	Asr	Ala			Pro	Ala	Arg			Asn	Leu	Pro			Ala	
			500)				505)				510	J		

tgg	aca	cat	cgg	agt	gcg	gat	gtt	aca	aat	aca	gtt	tat	tca	ga t	aaa	1584
Trp	Thr	His	Arg	Ser	Ala	Asp	Val	Thr	Asn	Thr	Val	Туг	Ser	Asp	Lys	
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He	Thr	Gln	He	Pro	Val	Val	Lys	Ala	His	Thr	Leu	Val	Ser	Gly	Thr	
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ac t	gtt	att	aaa	ggt	cct	gga	ttt	aca	gga	ggc	aat	atc	ctt	aaa	aga	1680
Thr	Val	He	Lvs	Gly	Pro	Gly	Phe	Thr	Gly	Gly	Asn	He	Leu	Lys	Arg	
545			•		550	-				555					560	
aca	agt	agt	ggt	ccg	t t a	gct	tat	ac t	agt	gtc	tct	gta	aaa	tca	cca	1728
	-	-		Pro					_							
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				Tyr		-										
20			580					585	Ü	•			590			
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				Val												
	6	595					600					605				
		000														
øt t	aat	aaa	acc	atg	aat	aaa	ggg	gat	gat	tta	ac a	ttt	aat	aca	ttt	1872
-				Met												
,	610	2,5				615	0.,	710 p	,	200	620	1				
	0.0															
gar	tta	gca	ac t	att	ggt	act	gc t	ttc	aca	111	tca	aat	tac	teg	gat	1920
-				Ile												
625	Leu	711 ti		110	630					635			-,-	001	640	
020					000					000					010	
			a t a	ggt	~~ ~ ~	an t	tet		ac t	ton	aan	aas	ass	at t	tat	1968
_				GIV												1300
261	Leu	1111	141			лэр	361	THE	650		Uly	uıy	oru	655		
				645					000					000		
-4-			44-					at a		<i>a</i> o	000		an c	ac.	ga a	2016
gta	gal	aag	LIC	gaa	CII	aıl	ccg	gia	aal	gca	aca		gaa	gca	gaa	2010

Val	Asp	Lys		Glu	Leu	He	Pro	Val 665	Asn	Ala	Thr	Phe	Glu 670		Glu	
			660					000					010			
gaa	gac	cta	gat	gtg	gca	aag	aaa	gca	gta	aat	ggc	ttg	ttt	acg	agt	2064
Glu	Asp	Leu	Asp	Val	Ala	Lys	Lys	Ala	Va l	Asn	Gly	Leu	Phe	Thr	Ser	
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Lys	690	Asp	Ala	Leu	GIN	1nr 695	ser	vai	Inr	ASP	700	GIN	vai	ASII	GIII	
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Ala	Ala	Asn	Leu	Val	Glu	Cys	Leu	Ser	Asp	Glu	Leu	Tyr	Pro	Asn	Glu	
705					710					715					720	
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		atg Met														2200
Lys	Arg	we t	Leu	725	Азр	nia	rai	Lys	730	ліа	Lys	MIG	Lcu	735		
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Ala	Arg	Asn	Leu	Leu	Gln	Asp	Thr	Gly	Phe	Asn	Arg	He	Asn	Gly	Glu	
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71311	UI,	755		٠.,			760					765				
ctg	t t t	aaa	gat	cgt	tcg	ctt	cgt	ttg	aca	agt	gcg	aga	gag	att	gat	2352
Leu	Phe	Lys	Asp	Arg	Ser		Arg	Leu	Thr	Ser			Glu	He	Asp	
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200	an n	aca	121		200	tat	ctc	tat	caa	caa	ata	gat	gaa	tca	ctt	2400
	-	Thr														2100
785		••••	.,.		790			-,-		795					800	
t t a	aaa	сса	tat	aca	aga	tat	aaa	cta	aaa	ggt	t t t	ata	gga	agt	agt	2448
Leu	Lys	Pro	Tyr	Thr	Arg	Туг	Lys	Leu	Lys	Gly	Phe	He	Gly	Ser	Ser	
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caa	gat	t t a	gag	att	aaa	t t a	ata	cgt	cat	cgg	gca	aat	caa	atc	gtc	2496
Gln	Asp	Leu	Glu	He	Lys	Leu	He	Arg	His	Arg	Ala	Asn	Gln	Пe	Val	
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aaa	aat	gta	cca	gat	aat	ctc	tig	cca	gat	gta	ctc	cct	gtc	aa t	tct	2544
Lys	Asn	Val	Pro	Asp	Asn	Leu	Leu	Pro	Asp	Val	Leu	Pro	Val	Asn	Ser	
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tgt	ggt	ggg	atc	gat	cgc	tgc	agt	gag	caa	cag	tat	gta	gac	gcg	aat	2592
Cvs	Gly	Gly	He	Asp	Arg	Cys	Ser	Glu	Gln	Gln	Tyr	Val	Asp	Ala	Asn	
	850	-				855					860					
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Leu	Ala	Leu	Glu	Asn	Asn	Gly	Glu	Asn	Gly	Asn	Met	Ser	Ser	Asp	Ser	
865					870					875					880	
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		,	900	,				905					910			
gca	aca	cta	gga	aat	ctt	gaa	ttg	gta	gaa	gag	ggg	cca	ttg	tca	ggg	2784
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_			-	-				Gln	-							
oru	930	Leu	O. u	6	711 W	935	0	0111	٠.٠	0	940	,		110 p	2,0	
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a t a	ac a	202	222	cat	aaa	σca	tca	gaa	222	σra	tat	tat	or a	or a	aag	2880
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945	лια	AI B	Lys	,11 B	950		561	o i u	2,3	955		.,,	u	u	960	
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Gln Ala Ile	Asp Arg Leu Ph	e Ala Asp Tyr 970	Gln Asp Gln Lys	Leu Asn 975
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Ser Ile Pro	Tyr Val Tyr As	ı Asp Ala Leu	Pro Glu Ile Pro	Gly Met
995		1000	1005	
			aga ctc caa caa	
ASH TYF THE 1010	Ser rue ini Gi		Arg Leu Gln Gln 1020	Ala Irp
1010	101	,	1020	
aat ttg tat	gat cit cga aa	get ata cca	aat gga gat tit	cga aat 3120
_	_	_	Asn Gly Asp Phe	-
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gga tta agt	gat tgg aat gc	aca tca gat	gtg aat gtg caa	caa cta 3168
Gly Leu Ser	Asp Trp Asn Ala	Thr Ser Asp	Val Asn Val Gln	Gln Leu
	1045	1050		1055
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1	1060	1065	1070	
	202 811 202 204		tat gtg tta cgt	gtc aca 3264
			Tyr Val Leu Arg	
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			Val Ile Ile Arg	
1090	109	i	1100	
gcg aat cag	aca gaa aca cto	aca ttt aat	ata tgt gat gat	gat aca 3360
Ala Asn Gln	Thr Glu Thr Le	Thr Phe Asn	He Cys Asp Asp	Asp Thr
1105	1110	İ	1115	1120

ggt git tia tot got gat caa act ago tat ato aca aaa aca gig gaa 3408 Glv Val Leu Ser Ala Asp Gln Thr Ser Tyr lle Thr Lys Thr Val Glu 1125 1130 1135 tic act cca tct aca gag caa git igg ait gac aig agt gag acc gaa 3456 Phe Thr Pro Ser Thr Glu Gln Val Trp Ile Asp Met Ser Glu Thr Glu 1140 1145 1150 ggt gta ttc aac ata gaa agt gta gaa ctc gtg tta gaa gaa gag taa 3504 Gly Val Phe Asn Ile Glu Ser Val Glu Leu Val Leu Glu Glu Glu 1155 1160 1165

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<213 Bacillus thuringiensis

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SEQUENCE LISTING

<110> ASANO, Shinichiro

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Ser Glu Gly Glu Asn Pro Glu Leu Phe Gly Asn Pro Glu Thr Phe Ile 50 55 60

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- Gly Ala Asp Leu Ala Asn Tyr Tyr Ala Gln Val Tyr Gly Val Pro Tyr 420 420 430
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- Arg Gly Tyr Ser His Arg Leu Ser His Ile Thr Ser Tyr Ser Phe Ser 485 490 495
- Lys Asn Ala Ser Ser Pro Ala Arg Tyr Gly Asn Leu Pro Val Phe Ala 500 505 510
- Trp Thr His Arg Ser Ala Asp Val Thr Asn Thr Val Tyr Ser Asp Lys 515 520 525
- Ile Thr Gln Ile Pro Val Val Lys Ala His Thr Leu Val Ser Gly Thr 530 535 540

- Thr Val Ile Lys Gly Pro Gly Phe Thr Gly Gly Asn Ile Leu Lys Arg 545 550550555555
- Thr Ser Ser Gly Pro Leu Ala Tyr Thr Ser Val Ser Val Lys Ser Pro 565 570 575
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- Thr Glu Thr Tyr Pro Thr Tyr Leu Tyr Gln Gln Ile Asp Glu Ser Leu 785 $$ 790 $$ 790 $$ 800
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- Gln Asp Leu Glu Ile Lys Leu Ile Arg His Arg Ala Asn Gln Ile Val $820 \\ 825 \\ 830$
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- Leu Ala Leu Glu Asn Asn Gly Glu Asn Gly Asn Met Ser Ser Asp Ser 865 $$ 870 $$ 875 $$ 880
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- Ser Ile Pro Tyr Val Tyr Asn Asp Ala Leu Pro Glu Ile Pro Gly Met $995 \hspace{0.5cm} 1000 \hspace{0.5cm} 1005 \hspace{0.5cm}$
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- Trp Asn Leu Tyr Asp Leu Arg Asn Ala Ile Pro Asn Gly Asp Phe 1025 1030 1035
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625					630					635					640	
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